Review of Erosion and Sedimentation Program Delegation to the North Carolina Department of Transportation, Division of Highways

November 29, 2011

Performed by:

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North Carolina Department of Environment and Natural Resources
Division of Land Resources
Land Quality Section

The Land Quality Section reviewed the program delegation to the Department of Transportation, Division of Highways (DOT) on September 27-29, 2011. The projects selected for review were a mix of contract construction, design-build and maintenance. The review and the results reported here are in accordance with requirements of the Sedimentation Control Commission (SCC) delegation to the DOT.

PROJECT REVIEWS

Twelve contract construction or design-build projects, and four maintenance/force account projects were chosen based on the stage of construction and the significance of the projects. Projects were 19 to 67 percent complete. The projects selected were:

CONTRACT OR DESIGN-BUILD PROJECTS

Division	County	TIP #	Route	Contract Amount	Length	% Complete
2	Craven	R-3403AB	US 17	$8,163,102.72	2.26	43
2	Lenoir	U-2928B	Rail Line from NCRR to GTP	$14,288,757.30	5.64	37
3	Brunswick	R-2633AA	Future I-140, Wilmington Bypass	$81,664,356.02	6.12	31
5	Durham	U-3804	SR 1321, Hillendale Road	$4,222,625.78	1.07	33
6	Harnett	B-4138	US 401 Bridge Cape Fear River	$5,953,445.40	.072	31
6	Cumberland	X-0002BC	I-295 Fayetteville Outer Loop	$55,258,773.41	8.36	19
7	Guilford	R-2612A	US 421	$11,684,536.56	.992	38
8	Randolph	R-2606B	US 311	$99,746,802	7.92	67
10	Mecklenburg	R-3677	SR 3135 Lebanon Road	$1,490,284.26	.189	64
11	Ashe	R-2100B	NC 16	$9,359,000.00	2.45	32
13	Rutherford	R-2233AA	US 221	$35,855,176.99	5.08	41
14	Swain	B-4286	US 19 Bridge over Nantahala River	$2,111,817.00	.147	33

MAINTENANCE/FORCE ACCOUNT PROJECTS

Division	County	Route	Length
2	Pitt	SR 1214, Fish Pond Rd.	0.4
6	Harnett	SR 1123, Creeksville Ch. Rd.	0.5
11	Alleghany	SR 1134, Harold Road	0.4
14	Macon	SR 1521 Mountain Grove Rd.	2.0

OVERALL REVIEW CRITERIA

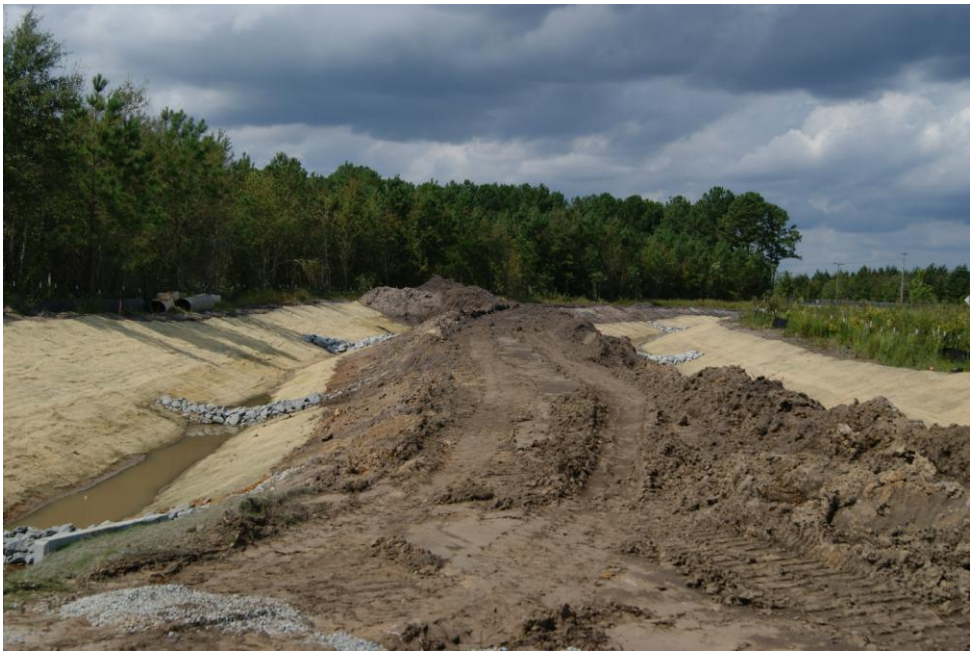
The Roadside Environmental Unit (REU) notified project construction management personnel of the review on the day preceding each day of review. Each project review consisted of reviewing the erosion control plan for adequacy, inspecting the project for compliance, and examining the project files. LQS regional office personnel participated in the project inspections. Plans were available for review at all sites.

Contract Construction Projects Summary

Division	Route	Plan		Measures		Ground Cover		Overall Effectiveness
		adequacy	Implement-tation	Installa-tion	Mainte-nance	timeliness	adequacy	
2	US 17	Yes	Yes	Yes	Yes	Yes	Yes	Good
2	Rail Line from NCRR to GTP	Yes	Yes	Yes	Yes	Yes	Yes	Good
3	Future I-140, Wilmington Bypass	Yes	Yes	No	Yes	Yes	Yes	Fair
5	SR 1321, Hillendale Road	Yes	Yes	Yes	No	Yes	Yes	Fair to Good
6	US 401 Bridge over Cape Fear River	Yes	Yes	Yes	Yes	Yes	Yes	Fair
6	I-295 Fayetteville Outer Loop	Yes	Yes	Yes	Yes	Yes	Yes	Good
7	US 421	Yes	Yes	Yes	Yes	No	No	Fair
8	US 311	Yes	Yes	Yes	Yes	No	Good	Good
10	Lebanon Road	Yes	Yes	Yes	Yes	Yes	Good	Good
11	NC 16	Yes	Yes	Yes	Yes	Yes	Fair	Good
13	US 221	No	Yes	Yes	No	Yes	Good	Fair
14	US 19 Bridge over Nantahala River	Yes	Yes	Yes	Yes	Yes	Good	Good

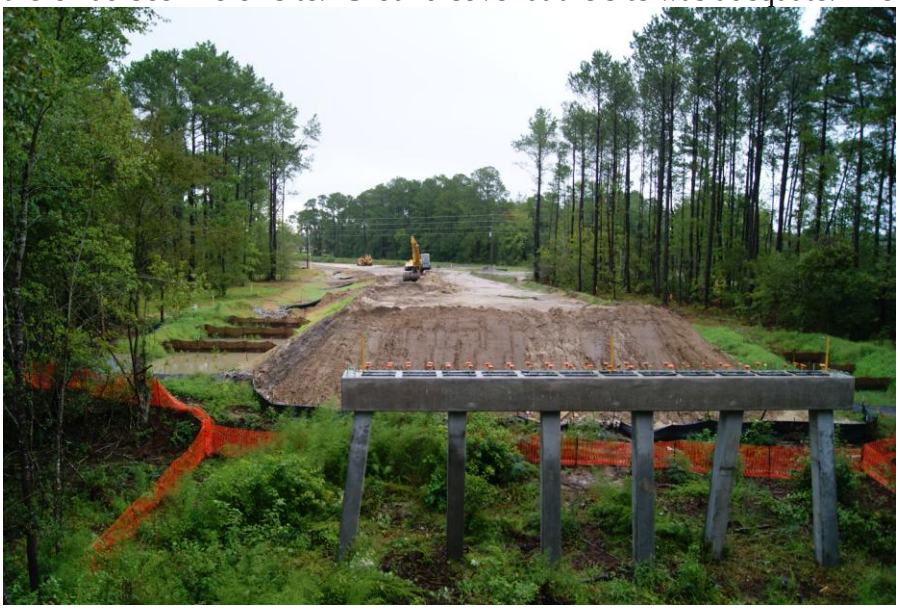
US 17 from NSRR to SR 1433— The plans were adequate and changes had been documented on the plans. Both the self inspections required in the SPCA and the Water Quality inspections were being performed. Measures were in and functioning. Ground cover was good except in the bottoms of a few of the ditches. There was a need of additional slope drains to take the water off of the graded road bed. There was evidence of some slope failures because of the lack of adequate slope drains. There had been some very slight offsite sedimentation, however the overall site was in compliance.

Rail Line from NCRR to GTP — The plans were adequate and changes had been documented on the plans. Both the self inspections required in the SPCA and the Water Quality inspections were being performed. The grading of the railroad bed should be completed before the side slopes are graded. Sediment controls measures should be left in until the side slopes and railroad bed are stabilized. Most of the sediment control measures had been removed once the side slopes had been stabilized but grading continued on the railroad bed in places with the possibility of off-site sediment. There needs to be some means to access the site once the tracks are placed. Site needed entrance and exit pads. There had been no offsite sedimentation but the potential was high.



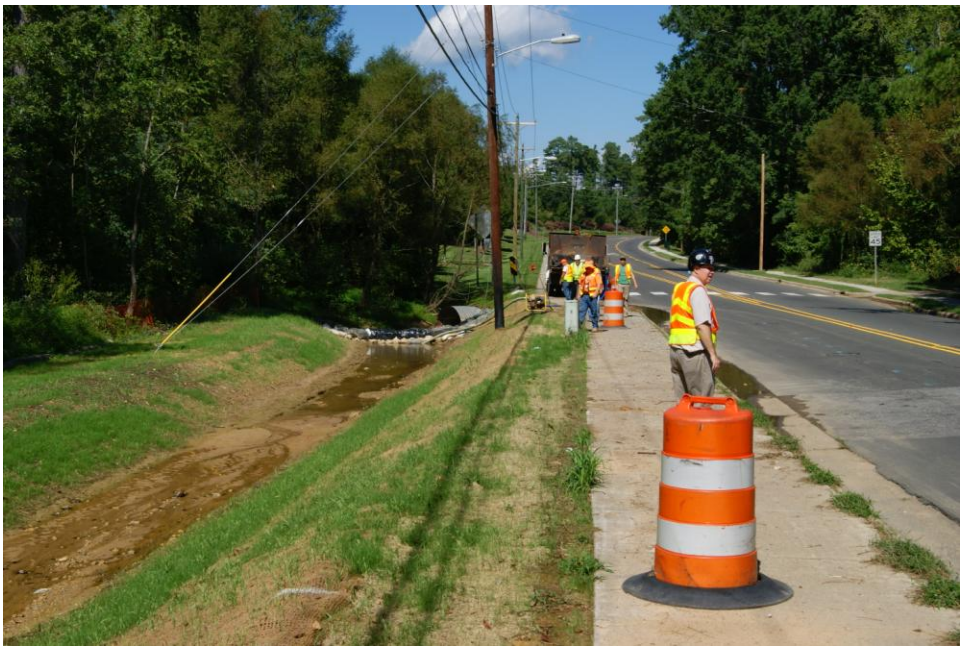
Railroad grade for Global Transpark

Future I-140, Wilmington Bypass — The plans were adequate and changes had been documented on the plans. Both the self inspections required in the SPCA and the Water Quality inspections were being performed. At one area on the site, measures for the clearing and grubbing phase had been removed and the measures for the final phase had been installed but site was not graded to drain to the final phase measures. A rock check dam was the only sediment control in this area. Fortunately there had been no offsite. Ground cover at the site was adequate. The site was not in compliance.



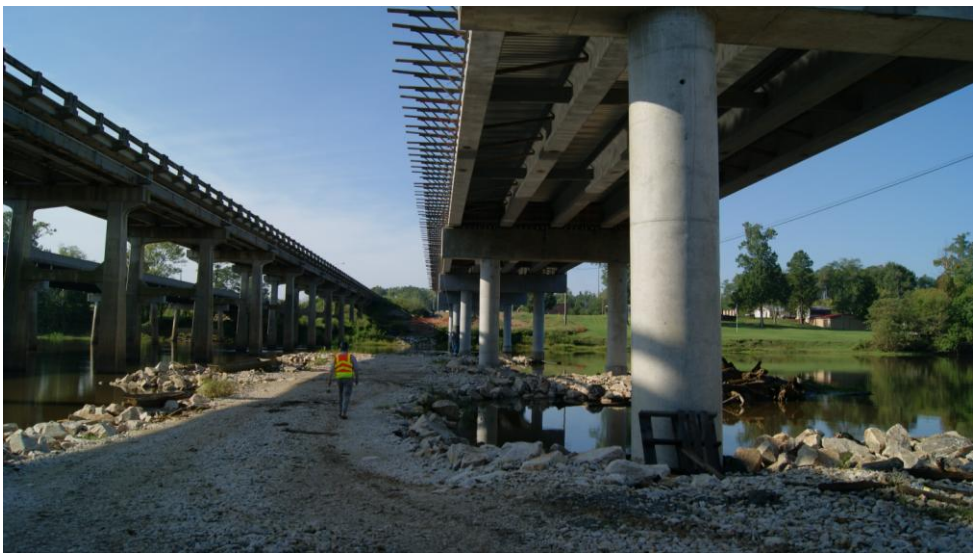
Bridge approach on Wilmington Bypass

SR 1321, Hillendale Road— The plans were adequate and changes had been documented on the plans. Both the self inspections required in the SPCA and the Water Quality inspections were being performed. Measures were mostly in and functioning. Ground cover is adequate in some areas but not adequate in other areas of the project. There was a soil stock pile that was not shown on the plans.



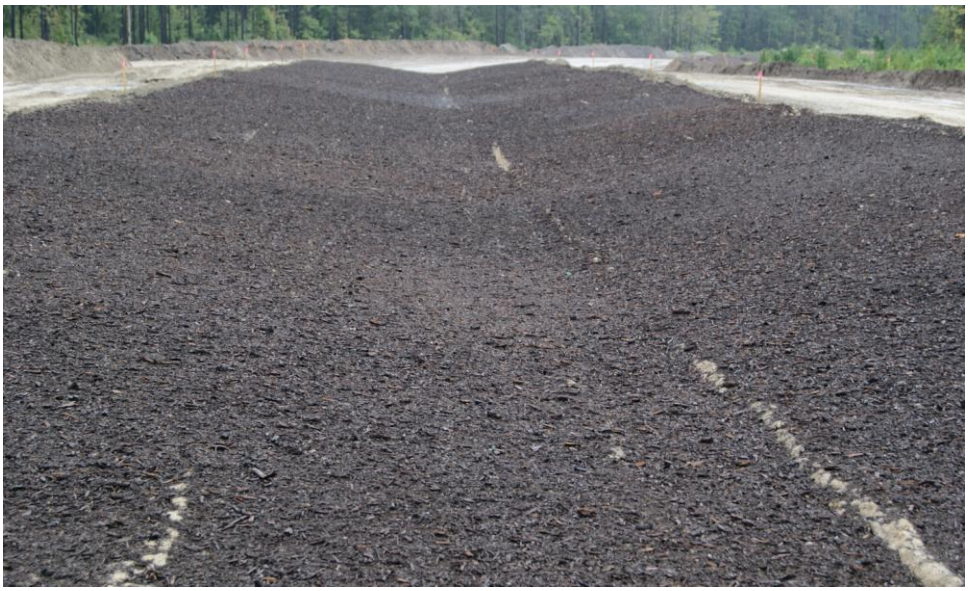
Stream channel relocation on Hillendale Road

US 401 Bridge over Cape Fear River— The plans were adequate and changes had been documented on the plans. Both the self inspections required in the SPCA and the Water Quality inspection was being performed. Measures were in and functioning with mixed results. Maintainance of some of the measures was needed. Ground cover was adequate except in several place along the back slope of the stream restoration channel. There had been no offsite sediment.



US 401 Bridge over Cape Fear River

I-295, Fayetteville Outer Loop— The plans were adequate and changes had been documented on the plans. Both the self inspections required in the SPCA and the Water Quality inspection were being performed. Measures were in and functioning. Slope had been seeded and mulched but ground cover had not come up in several. Reseeding and mulching was in progress. Areas near wetlands had been cleared but not grubbed and were heavily mulched. There was no off-site sedimentation and the site was in compliance.

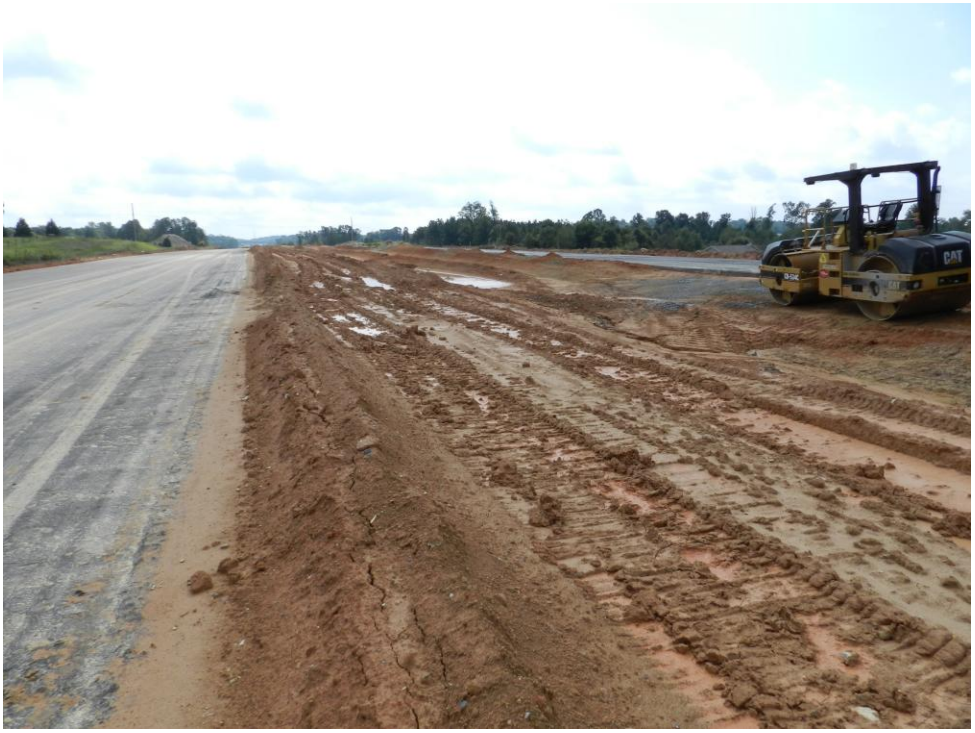


Mulching of median

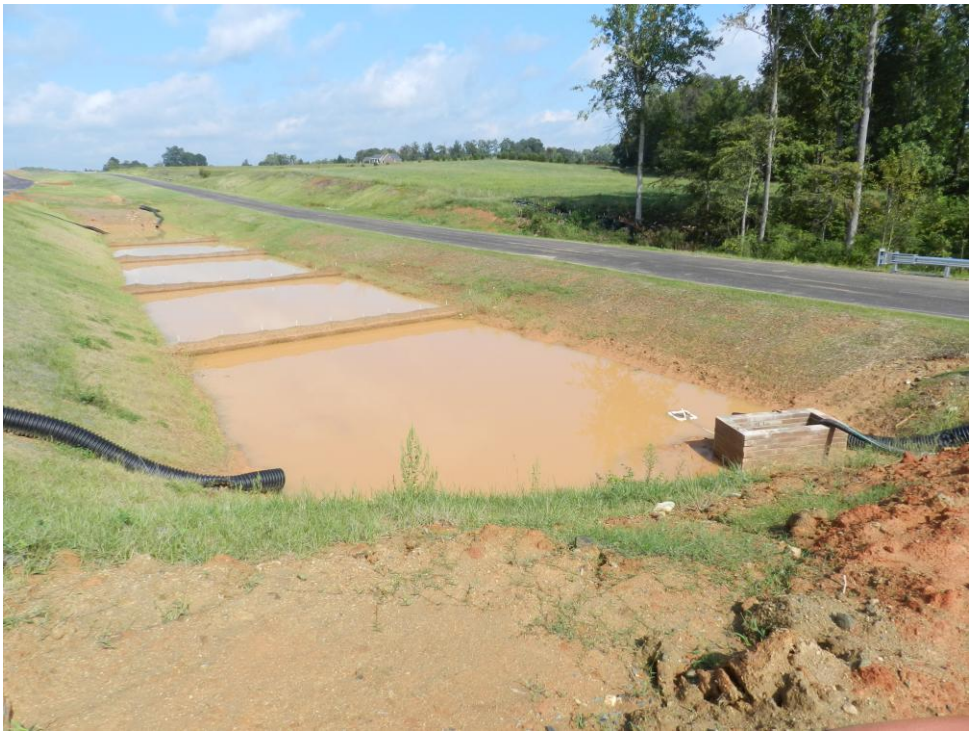
US 421—Sedimentation control measures were in place, but were not completely effective. Ground cover had not been provided on slopes in a timely manner. It appeared that the large areas had been prepared for seeding, but a rainy and wet period had set in before the seeding contractor had mobilized to the site. Stream turbidity was severe. Slight to moderate stream sedimentation was anticipated based on the level of suspended sediment in the streams.

Fill slopes and creek on US 421

US 311—The project was generally in good condition. The median was being used as a haul road during paving operations. This kept the soil in the median bare and contributed to sedimentation of the median inlets. Slight stream sedimentation was observed.



Haul road in median of US 311

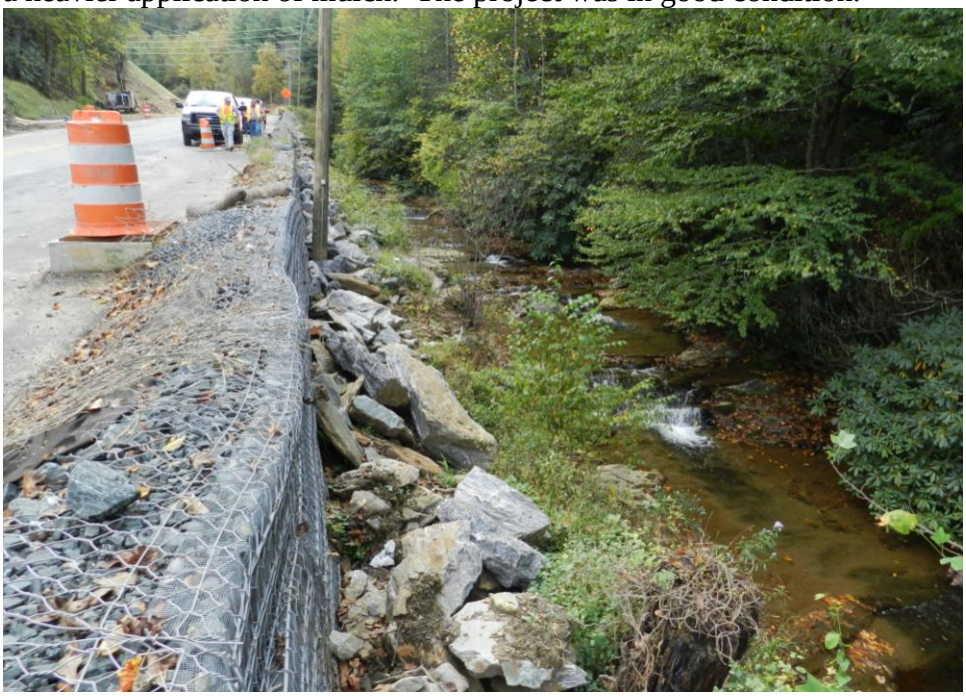


Sedimentation basin on US 311

Lebanon Road— This project included replacing a bridge on a two lane road. One side of the road widening had been done and permanently stabilized. The other side was under construction. No stream sedimentation was observed. The project was in good condition.

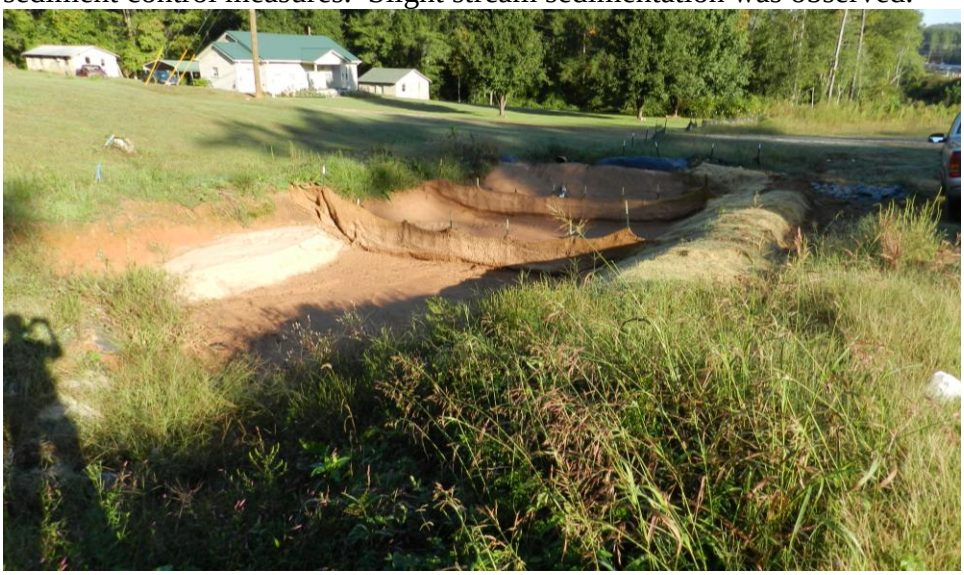
Lebanon Road bridge site

NC 16—The highway is being widened along a stream and the New River. No sedimentation damage was observed, despite the close proximity to the streams. New seeding of cut slopes needed a heavier application of mulch. The project was in good condition.



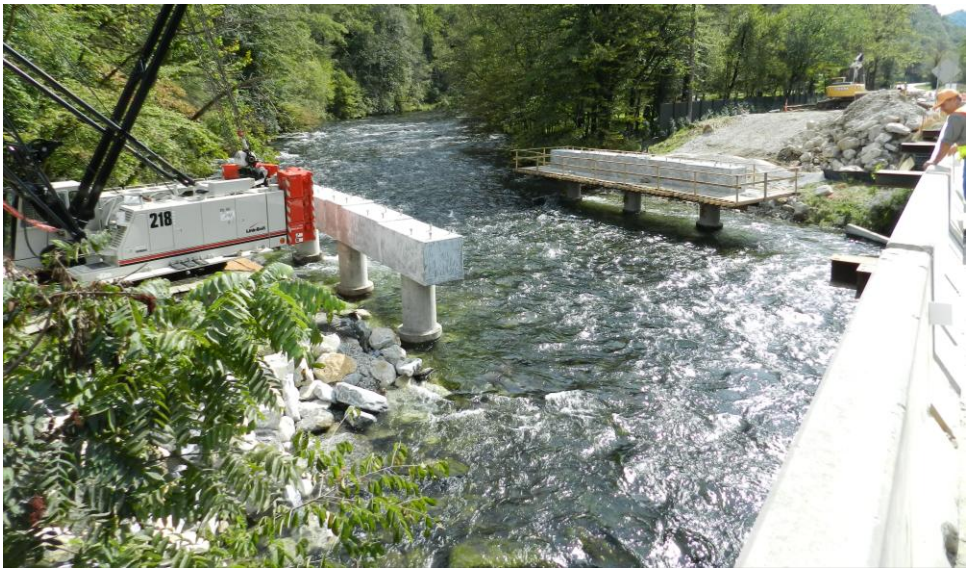
NC 16 widening along stream

US 221—The location and design of some of the sediment basins did not fit the existing topography and available right-of-way. Two basins were observed to have been overwhelmed with more stormwater runoff than they could effectively handle. Maintenance of measures was behind. It appeared that additional equipment and personnel were needed to catch up on the maintenance of sediment control measures. Slight stream sedimentation was observed.



Sediment basin on US 221 that had sediment pass through the basin. Note sand behind first baffle and silt on geotextile fabric spillway.

US 19 Bridge over Nantahala River—This is a very visible project on a river heavily used for recreation. The measures were well installed and very effective. Care had been taken to remove loose riprap from the river as the bridge columns were completed. The project was in good condition.



US 19 Bridge over Nantahala River

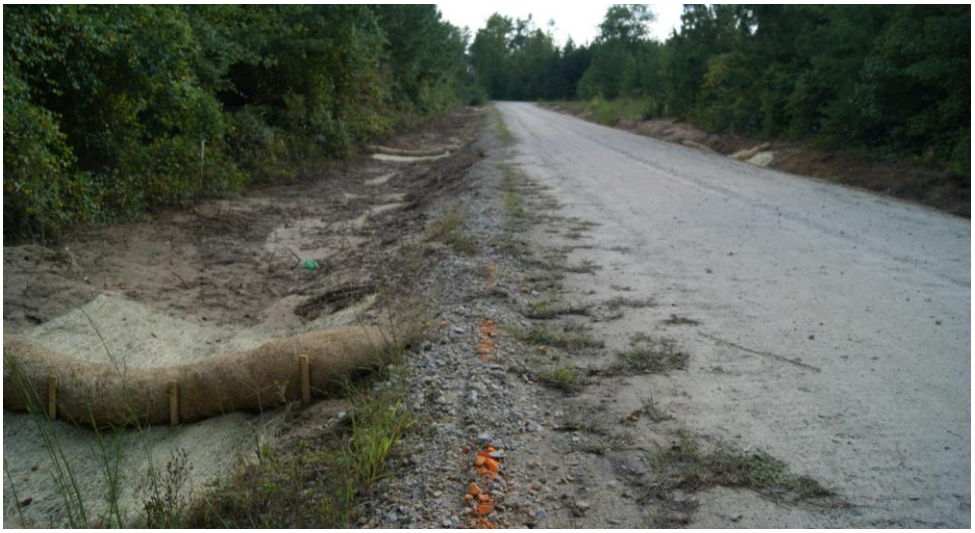
Maintenance Projects Summary

Division	Route	Plan		Measures		Ground Cover		Overall Effectiveness
		adequacy	Implement -tation	Installa- tion	Mainte -nance	timeliness	adequacy	
2	SR 1214, Fish Pond Rd.	Yes	Yes	Yes	Yes	Yes	Yes	Good
6	SR 1123	Yes	Yes	Yes	Yes	Yes	Yes	Fair to Good
11	SR 1134, Harold Road	Yes	No	No	Yes	No	Yes	Fair
14	SR 1521-A Onion Mtn. Rd.	Fair	Yes	Yes	Yes	Yes	Fair	Fair to Good

SR 1214, Fish Pond Road— The plan was adequate and changes had been documented. The Measures for the bridge were in and functioning. Rest of the project had not started.

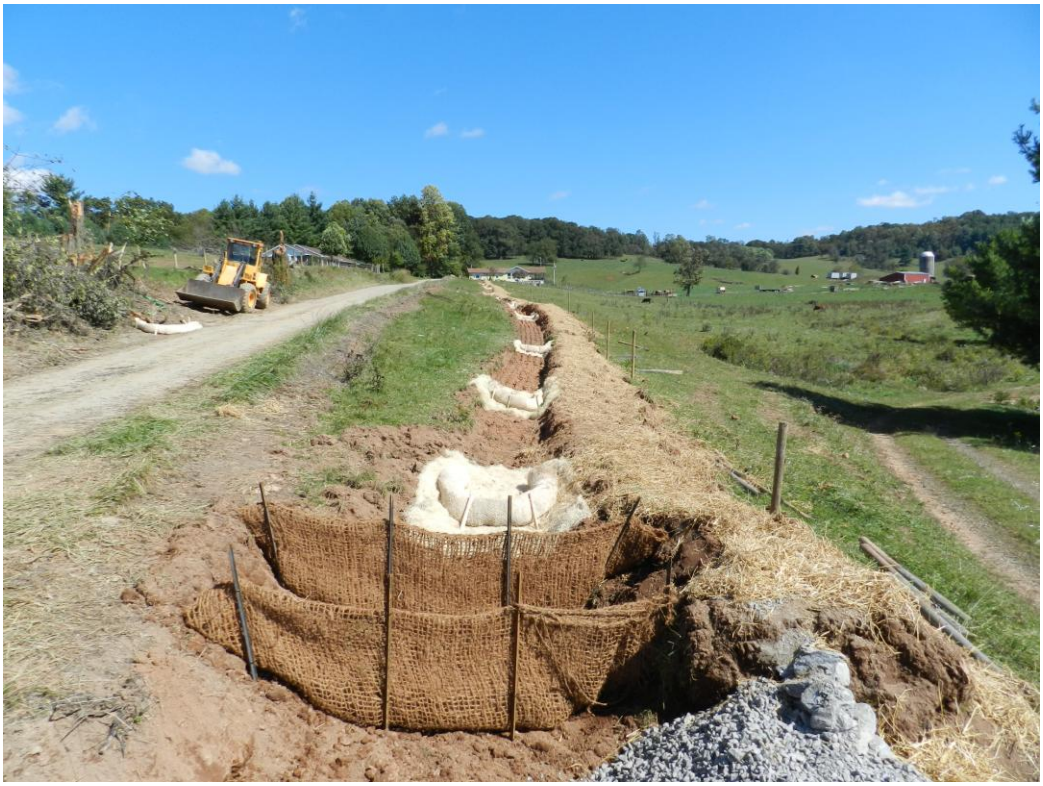
Fish Pond Road Bridge, with turbidity curtains

SR 1123, Creeksville Church Road— Ground cover could be applied sooner. There was slight offsite sedimentation. Right-of-way was not adequate, however the site was in compliance.



SR 1123, Creeksville Church Road

SR 1134, Harold Road— The project is a secondary road that is being widened and paved beside the Little River. The day before the review the project was issued an ICA by the Roadside Environmental Technician for blasting damage to the buffer zone of the river. Portable "Jersey" barrier had been substituted for blast mats, but only a small portion of the buffer had been protected. The river bank had been cleaned up, seeded and matted. Reforestation would need to take place in the winter. Sediment control measures had vertical sides and needed to be regarded. Seeding of cuts had not been done within 30 days of disturbance, as required by the erosion control plan.



Measures along Harold Road

SR 1521-A, Onion Mountain Road—A narrow gravel road is being widened and paved around a winding mountain-side. The plans were an older style "straight-line" schematic layout, that does not show curves in the road. The spacing between straw or excelsior wattles was needed on the plan. Hydro-seeding of cut slopes needed an adequate application of mulch, such as bonded fiber matrix for flexible growth medium. The fill slope was being widened with a aid of a gabion wall. During work, the project was vulnerable to sediment loss. Protection depended upon getting each day's work complete and provided with temporary ground cover.

SR 1521-A, Onion Mountain Road

ADMINISTRATIVE REVIEW

REU has developed an Excel spreadsheet for sizing of sedimentation basins. The construction detail for sedimentation basins has been updated. These documents are available to the public at http://ncdot.gov/doh/operations/dp%5Fchief%5Feng/roadside/soil_water/erosion_control/

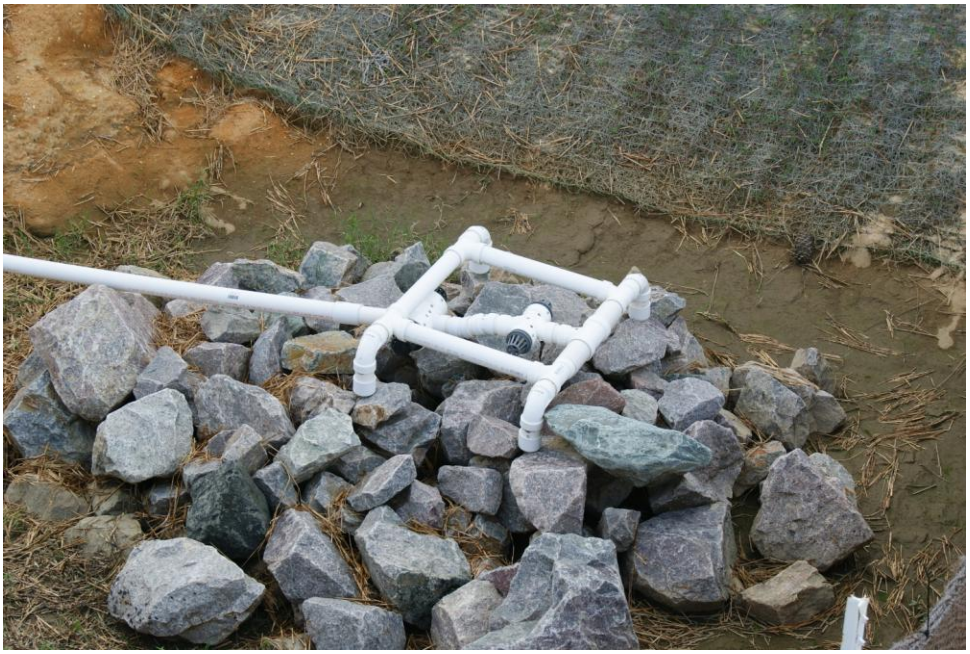
DOT Internal Inspection Process

REU Field Operations staff inspects all DOT projects. Projects are inspected monthly. Each project is evaluated on a scale of 1-10 for installation of measures, maintenance of measures, effectiveness of measures, plan implementation and overall project evaluation. A score of 6 or less results in the issuance of an "Immediate Corrective Action" report (ICA). Land Quality records indicate 12 ICA's were issued from November 1, 2010 through October 31, 2011. Thirteen were issued last year.

ISSUES NOTED AND RECOMMENDATIONS

Skimmer Dewatering Time

Some of the skimmers used by NC DOT contractors appeared to dewater at a rapid rate. Checking the flow rate of skimmers with a simple method such as a bucket and stopwatch is suggested when basins are observed to rapidly dewater.



Skimmer with large inlet openings

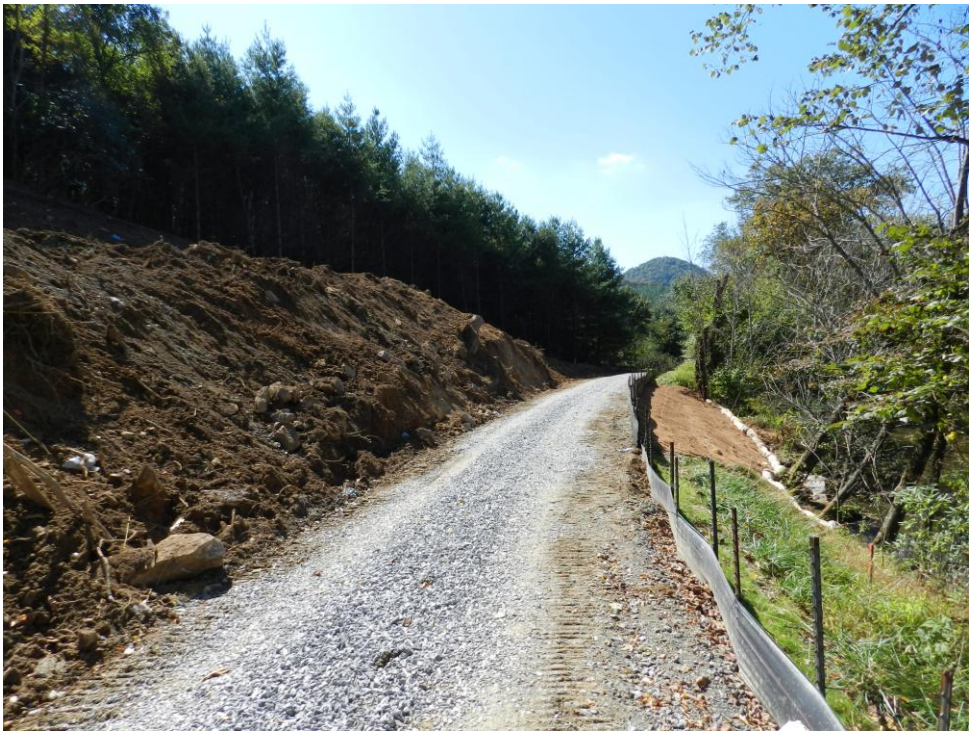
Ground Cover on Steep Slopes

Steep cut slopes had been hydroseeded. Blown straw mulch had not been tacked, and had fallen or blown off the slopes. Some grass had sprouted, but temporary ground cover was inadequate. The use of tack over straw should be mandatory. Matting, BFM or FGM should be required on slopes steeper than 2:1.

SR 1521-A, Onion Mountain Road. Note two stages of ground cover on cut slope.

Blasting Damage to Stream Buffer

Blasting damage to vegetation in the stream buffer zone has been noted in three annual reviews, including this year. The blasting contract objected to the use of blast mats due to the vertical slopes. Portable concrete barrier was substituted along the river bank, but it only protected a small portion of the blast area. Soil and rock were thrown down to the river. Only the area with adequate protection should have been blasted. NC DOT has a set of general conditions that apply to work in the buffer zone of trout waters. District and county maintenance engineers need to adhere to these conditions.



SR 1134, Harold Road in Alleghany County. Note repaired river bank on right.

Transition from Clearing Plan to Final Grade Plan

Projects were observed where runoff was not yet flowing to the sediment basins designed for the final grade. The runoff was overloading small measures not designed to handle the drainage. Plans for intermediate stages of grading are recommended on sites with large fills. Project inspectors and Roadside Environmental staff need to emphasize designing adequate measures for the transition from clearing to final grade.

Adequate Right-of-Way

A lack of adequate right-of-way for some contract construction and secondary road projects was observed. This results in slopes that are too steep to readily stabilize with vegetation, and insufficient room for sedimentation control measures. Sufficient right-of-way for slope stabilization and adequate sediment control should be a prerequisite for secondary road widening.